

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

NEW APPLICATION TRANSMITTAL

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of SYSTEM AND METHOD FOR COPY PROTECTION FOR DIGITAL SIGNALS

Inventor(s): Jack Chaney

WARNING:

37 CFR § 1.41 (a)(1) points out:

"(a) A Patent is applied for in the name or names of the actual inventor or inventors.

"(1) The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by § 1.63, except as provided for in § 1.53 (d)(4) and § 1.63(d). If an oath or declaration as prescribed by § 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to § 1.53 (b), unless a petition under this paragraph accompanied by the fee set forth in § 1.17(i) is filed supplying or changing the name or names of the inventor or inventors."

For (title):

1. Type of Application

This new application is for a(n)

(check one applicable item below)

☒ Original (nonprovisional)

☐ Design

☐ Plant

G:\KLS\SAMI\TRANS-58.FRM

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

WARNING: Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4), unless the International Application is being filed as a divisional, continuation or continuation-in-part application.

WARNING: *Do not use this transmittal for the filing of a provisional application.*

NOTE: If one of the following 3 items apply then complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED and a NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION.

- ☐ Divisional
- ☐ Continuation
- ☐ Continuation-in-part (C-I-P)

2. Benefit of Prior U.S. Application(s)

NOTE: A nonprovisional application may claim an invention disclosed in one or more prior filed copending nonprovisional applications or copending international applications designating the United States of America. In order for a nonprovisional application to claim the benefit of a prior filed copending nonprovisional application or copending international application designating the United States of America, each prior application must name as an inventor at least one inventor named in the later filed nonprovisional application and disclose the named inventor's invention claimed in at least one claim of the later filed nonprovisional application in the manner provided by the first paragraph of 35 U.S.C. 112. Each prior application must also be:

- (i) An international application entitled to a filing date in accordance with PCT Article 11 and designating the United States of America; or
- (ii) Complete as set forth in § 1.51(b); or
- (iii) Entitled to a filing date as set forth in § 1.53(b) or § 1.53(d) and include the basic filing fee set forth in § 1.16; or
- (iv) Entitled to a filing date as set forth in § 1.53(b) and have paid therein the processing and retention fee set forth in § 1.21(l) within the time period set forth in § 1.53(f).

37 CFR § 1.78(a)(1).

NOTE: If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

WARNING:

If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. 120, 121 or 365(c). (35 U.S.C. 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. 119, 365(a) or 365(b)). For a c-i-p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.

WARNING:

When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application must be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 CFR § 1.78(a)(3).

- [] The new application being transmitted claims the benefit of prior U.S. application(s).
Enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE
BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

3. Papers Enclosed

- A. Required For Filing Date Under 37 § CFR 1.53(b) (Regular) or 37 § CFR 1.153
(Design) Application

Pages of Specification	<u>22</u>
Pages of Claims	<u>13</u>
Sheets of Drawing	<u>4</u>

WARNING:

DO NOT submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. For comments or proposed then-new 37 CFR 1.84, see Notice of March 9, 1988 (1990 O.G. 57-62).

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

NOTE: "Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page ..."37 CFR 1.84 (c)).

(complete the following, if applicable)

- ☐ The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)." 37 CFR 1.84(b).
☒ formal
☐ informal

B. Other Papers Enclosed X

Pages of declaration and power of attorney 2

Pages of abstract 1

Other _____

4. Additional papers enclosed

- ☐ Amendment to claims
- ☐ Cancel in this applications claims _____ before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)
- ☐ Add the claims shown on the attached amendment. (Claims added have been numbered consecutively following the highest numbered original claims.)
- ☐ Preliminary Amendment
- ☐ Information Disclosure Statement (37 CFR 1.98)
- ☐ Form PTO-1449 (PTO/SB/08A and 08B)

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

- ☐ Citations
 - ☐ Declaration of Biological Deposit
 - ☐ Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.
 - ☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative
 - ☐ Special Comments
 - ☐ Other _____
-

5. Declaration or oath (including power of attorney)

NOTE: A newly executed declaration is not required in a continuation or divisional application provided that the prior nonprovisional application contained a declaration as required, the application being filed is by all or fewer than all the inventors named in the prior application, there is no new matter in the application being filed, and a copy of the executed declaration filed in the prior application (showing the signature or an indication thereon that it was signed) is submitted. The copy must be accompanied by a statement requesting deletion of the names of person(s) who are not inventors of the application being filed. If the declaration in the prior application was filed under § 1.47, then a copy of that declaration must be filed accompanied by a copy of the decision granting § 1.47 status or, if a nonsigning person under § 1.47 has subsequently joined in a prior application, then a copy of the subsequently executed declaration must be filed. See 37 CFR §§ 1.63(d) (1)-(3).

NOTE: A declaration filed to complete an application must be executed, identify the specification to which it is directed, identify each inventor by full name including family name and at least one given name, without abbreviation together with any other given name or initial, and the residence, post office address and country or citizenship of each inventor, and state whether the inventor is a sole or joint inventor. 37 CFR § 1.63(a)(1)-(4).

☒ Enclosed,

executed by *(check all applicable boxes)*

☐ inventor(s).

PATENT APPLICATION

SHERMAN & SHERMAN REF. NO.: SAM1.0058

- ☐ legal representative of inventor(s). 37 CFR 1.42 or 1.43
- ☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.
- ☐ this is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached.

See item 13 below for fee.

- ☐ Not Enclosed.

NOTE: Where the filing is a completion in the U.S. of an International Application or where the completion of the U.S. application contains subject matter in addition to the International Application, the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.

- ☐ Application is made by a person authorized under 37 CFR 1.41(c) on behalf of *all* the above named inventor(s).

(The declaration or oath, along with the surcharge required by 37 CFR 1.16(e) can be filed subsequently).

- ☐ Showing that the filing is authorized.

(not required unless called into question. 37 CFR 1.41(d)).

6. Inventorship Statement

WARNING:

If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.

The inventorship for all the claims in this application are:

☒ The same.

or

☐ Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,

☐ is submitted.

☐ will be submitted.

7. Language

NOTE: An application including a signed oath or declaration may be filed in a language other than English. An English translation of the non-English language application and the processing fee of \$130.00 required by 37 CFR 1.17(k) is required to be filed with the application, or within such time as may be set by the Office. 37 CFR 1.52(d).

☐ English

☐ Non-English

☐ The attached translation includes a statement translation and is accurate. 37 CFR 1.52(d).

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

8. Assignment

☐ An assignment of the invention to _____

☐ is attached. A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM TO 1595 is also attached.

☒ will follow.

NOTE: "If an assignment is submitted with a new application, send two separate letters - one for the application and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).

WARNING:

A newly executed "CERTIFICATE UNDER 37 CFR 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.

8. Certified Copy

Certified copy(ies) of application(s):

Country	Appln.	No.	Filed
*			
Country	Appln.	No.	Filed
*			
Country	Appln.	No.	Filed
*			

from which priority is claimed

☐ is/(are) attached

☐ will follow.

NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 CFR 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

G:\KLS\SAM1\TRANS-58.FRM

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

10. Fee Calculation (37 CFR 1.16)

A.

☒ Regular Application

CLAIMS AS FILED

	Number Filed		Number Extra		Rate	Basic Fee 37 CFR 1.16(a)
						\$ <u>790.00</u>
Total Claims (37 CFR 1.16(c))	32	-20 =	12	X	\$ 22.00	\$ <u>264.00</u>
Independent Claims (37 CFR 1.16(b))	7	-3 =	4	X	\$ 82.00	\$ <u>328.00</u>
Multiple dependent claim(s), if any (37 CFR 1.16(d))		+			\$270.00	\$ <u>0.00</u>

☐ Amendment canceling extra claims enclosed.

☐ Amendment deleting multiple dependencies enclosed.

☐ Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims canceled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 CFR 1.16(d).

Filing Fee Calculation \$ 1,382.00

B.

☐ Design Application
(\$330.00—37 CFR 1.16(f))

Filing Fee Calculation \$ _____

C.

☐ Plant Application
(\$540.00—37 CFR 1.16(g))

Filing Fee Calculation \$ _____

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

11. Small Entity Statement(s)

☐ Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is (are) attached.

WARNING:

"Status as a small entity must be specifically established in each application or patent in which the status is available and desired. Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. The refiling of an application under § 1.53 as a continuation, division, or continuation-in-part (including a continued prosecution application under § 1.53 (d)), or the filing of a reissue application requires a new determination as to continued entitlement to small entity status for the continuing or reissue application. A nonprovisional application claiming benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) of a prior application, or a reissue application may rely on a statement filed in the prior application or in the patent if the nonprovisional application or the reissue application includes a reference to the statement in the prior application or in the patent or includes a copy of the statement in the prior application or in the patent and status as a small entity is still proper and desired. The payment of the small entity basic statutory filing fee will be treated as such a reference for purposes of this section." 37 CFR §1.28(a)(2).

(complete the following, if applicable)

☐ Status as a small entity was claimed in prior application
_____/_____, filed on _____, from which benefit is
being claimed for this application under:

35 U.S.C. ☐ 119(e),
☐ 120,
☐ 121,
☐ 365(c),

and which status as a small entity is still proper and desired.

☐ A copy of the statement in the prior application is included.

Filing Fee Calculation (50% of A, B or C above)

\$ _____

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

NOTE: Any excess of the full fee paid will be refunded if small entity status is established and a refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendable under § 1.136. 37 CFR 1.28(a).

12. Request for International-Type Search (37 CFR 1.104(d))

(complete, if applicable)

- ☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13. Fee Payment Being Made At This Time

- ☐ Not Enclosed.

- ☐ No filing fee is to be paid at this time.

(This and the surcharge required by 37 CFR 1.16(e) can be paid subsequently.)

- ☒ Enclosed

- | | |
|--|--------------------|
| <input checked="" type="checkbox"/> Filing fee | \$ <u>1,382.00</u> |
| <input type="checkbox"/> Recording assignment
(\$40.00; 37 CFR 1.21(h))
(See attached COVER SHEET FOR ASSIGNMENT
ACCOMPANYING NEW APPLICATION) | \$ _____ |
| <input type="checkbox"/> Petition fee for filing by other than all the
inventors or person on behalf of the inventor
where inventor refused to sign or cannot be
reached. (\$130.00; 37 CFR 1.47 and 1.17(i)) | \$ _____ |
| <input type="checkbox"/> For processing an application with a
specification in a non-English language.
(\$130.00; 37 CFR 1.52(d) and 1.17(k)) | \$ _____ |
| <input type="checkbox"/> Processing and retention fee
(\$130.00; 37 CFR 1.53(d) and 1.21(l)) | \$ _____ |
| <input type="checkbox"/> Fee for international-type search report
(\$40.00; 37 CFR 1.21(e)) | \$ _____ |

NOTE: 37 CFR 1.21(l) establishes a fee for processing and retaining any application that is abandoned for failing to complete the application pursuant to 37 CFR 1.53(f) and this, as well as the changes to 37 CFR 1.53 and 1.78(a)(1), indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid, or the

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

processing and retention fee of § 1.21(l) must be paid within 1 year from notification under § 53(f).

Total fees enclosed \$ 1,382.00

14. Method of Payment of Fees

- ☒ Check in the amount of \$ 1,382.00
☐ Charge Account No. 19-1995 in the amount of \$ _____. A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 CFR 1.22(b).

15. Authorization to Charge Additional Fees

WARNING:

If no fees are to be paid on filing, the following items should not be completed.

WARNING:

Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

- ☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 19-1995.

- ☒ 37 CFR 1.16(a), (f) or (g) (filing fees)
☐ 37 CFR 1.16(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims canceled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

- ☐ 37 CFR 1.16(e), (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

[] 37 CFR §§1.17(a)(1)-(5) (extension fees pursuant to § 1.136(a)).

[] 37 CFR 1.17(a)(1)-(5) (application processing fees)

NOTE: "... A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 CFR § 1.136(a)(3).

[] 37 CFR 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 CFR 1.311 (b)).

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.311(b).

NOTE: 37 CFR 1.28(b) requires "Notification of any change in status resulting in loss of entitlement to small entity status must be filed in the application...prior to paying, or at the time of paying...the issue fee..." From the wording of 37 CFR 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity"; and (b) no notification is required if the change is to another small entity.

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

16. Instructions As To Overpayment

NOTE: "... Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 CFR § 1.26(a).

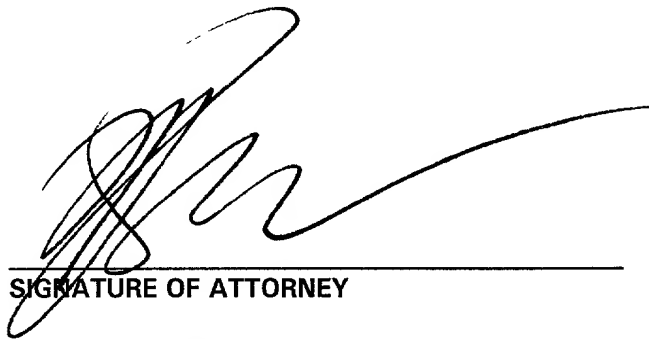
☒ Credit Account No. 19-1995

☐ Refund

SIGNATURE OF PRACTITIONER

Reg. No. 33,783

Tel. No. (310) 789-3200



SIGNATURE OF ATTORNEY

Kenneth L. Sherman
Type or print name of attorney

SHERMAN & SHERMAN
2029 Century Park East
Seventeenth Floor
Los Angeles, California 90067

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this New Application Transmittal and the documents referred to as attached therein are being deposited with the United States Postal Service on this date January 7, 1999 in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EH506244999US addressed to the: Assistant Commissioner for Patents, Washington, D. C. 20231.

EVELYN MENJIVAR

(Type or print name of person mailing paper)


(Signature of person mailing paper)

WARNING:

Certificate of mailing (first class) or facsimile transmission procedures of 37 CFR 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

WARNING:

Each paper or fee filed by "Express Mail" must have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 CFR 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight than can be avoided by the exercise of reasonable care, requests for waiver of this requirement will not be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

PATENT APPLICATION
SHERMAN & SHERMAN REF. NO.: SAM1.0058

☐ **Incorporation by reference of added pages**

(Check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED).

☐ **Plus Added Pages for New Application Transmittal Where Benefit Of Prior U.S. Application(s) Claimed**

Number of pages added _____

☐ **Plus Added Pages for Papers Referred To In Item 4 Above**

Number of pages added _____

☐ **Plus Added Pages deleting names of inventor(s) named in prior application(s) who is/are no longer inventor(s) of the subject matter claimed in this application.**

Number of pages added _____

☐ **Plus "Assignment Cover Letter Accompanying New Application"**

Number of pages added _____

☐ **Statement Where No Further Pages Added**

(If no further pages form a part of this transmittal, then end this transmittal with this page and check the following item)

☒ **This transmittal ends with this page.**

PATENT APPLICATION

DOCKET NO: SAM1.0058

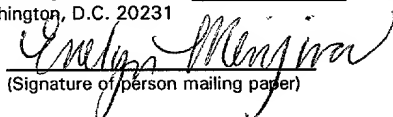
**SYSTEM AND METHOD FOR
COPY PROTECTION FOR DIGITAL SIGNALS**

CERTIFICATE OF MAILING BY "EXPRESS MAIL"

I hereby certify that this paper of fee is being deposited with the United States Postal Service on this date: January 7, 1999, in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EH506244999US addressed to: Box Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231

Evelyn Menjivar

(Type or print name of person mailing paper)


(Signature of person mailing paper)

By: Jack Chaney, U.S. Citizen
Inventor

SYSTEM AND METHOD FOR COPY PROTECTION FOR DIGITAL SIGNALS

1. Related Application

This application claims the benefit of U.S. Provisional Application No. 60/070,764, filed January 8, 1998.

2. Field of the Invention

The present invention relates to copy protection of consumer electronics media, and more particularly to methods and arrangements for providing copy protection for audio-visual signals used in consumer electronics.

3. Description of the Related Art

The proliferation of digital technology in consumer electronics has provided a plethora of digital consumer technology products that provide superior performance relative to their analog predecessors. However, the distribution of audio-visual information in digital format coupled with the availability of digital recording devices raises concerns about the piracy of digital audio-visual products, particularly in the entertainment industry. In response to this concern, the MPAA (Motion Picture Association of America) has proposed copy protecting motion pictures released on Digital Video Disk (DVD) to prevent a purchaser from purchasing a single copy and making and distributing multiple copies.

However, these concerns are not limited to audio-visual information released on DVD. Similar concerns exist for other media, for example, cable television and broadcast television among others.

Cable television distributors are concerned about protecting their transmissions. One approach has been to use conditional access to control the distribution of their transmission. Conditional access refers to controlling the distribution of information at user locations. An important difference between using conditional access and copy protection to control the distribution of material is that conditional access applies to particular distribution sites or nodes, while copy protection continues beyond the distribution sites or nodes.

Another approach for protecting audio-visual information has been to encrypt an audio-visual signal and add the capability for receivers to decrypt the audio-visual signal. One problem with this approach is that the receivers often require complex functionality to perform the decrypting, for example in the case of public/private key encryption/decryption.

Another proposal for copy protection of media has been provided by the Copy Protection Working Group (CPTWG) data transmission discussion group (DTDG) sub-committee for copy protection of Section 1394 technology. Section 1394 technology refers to a 100Mbit/sec or 400 Mbit/sec bus protocol commonly applicable to consumer electronics.

Another proposal is being developed by the National Renewable Security Standards Committee (NRSSC) # an interim standard of EIA (Electronics Industry Associates) security (IS679) that defines two interfaces for removable condition access security. These include what are referred to as a "smart card" and a PCMCIA card.

Figure 1 illustrates a conventional arrangement 100 for copy protecting an audio-visual signal using a replaceable security module that is coupled to a receiver via an IS679 interface. One or more audio-visual signals, identified as AVS_1 , through AVS_N , are provided to a transmitter 102, typically at rates in the range of 6Mbits/sec to 100 Mbits/sec. Audio-visual signals AVS_1 , AVS_2 through AVS_N , are encoded by encoders E_1 , E_2 through E_N respectively, using for example, MPEG encoding techniques, and separated into audio signals AS_1 , through AS_N and video signals VS_1 , VS_2 through VS_N .

Audio signals AS_1 , AS_2 through AS_N and video signals VS_1 , VS_2 through VS_N are then encrypted by scramblers S_1 , S_2 , through S_N respectively, using for example, any number of widely available key encryption techniques. The encrypted audio signals AS_1 , AS_2 through AS_N and video signals VS_1 , VS_2 through VS_N are then combined by a combiner 104 into a single audio-visual signals. Combiner 104 may include several processes such as multiplexers and other processors necessary to provide the single audio-visual signal.

The single audio-visual signal is then provided to a receiver 106 via a link 108. Link 108 can include one or more communication mediums and/or systems and supporting apparatuses that are configured to carry the single audio-visual signal between transmitter 102 and receiver 106. Examples of link 108 include, but are not limited to, a telephone system, a cable television system, a broadcast television system (direct or indirect), a satellite broadcast system (direct or indirect), one or more computer networks and/or buses, the Internet, an intranet, and any software, hardware and other communication systems and equipment associated therewith for transmitting encoded data between two locations.

After receiving the single audio-visual signal, receiver 106 transmits the audio-visual signal to a replaceable security module 110 via an interface 112. For IS679 applications, replaceable security module 110 is a smart card or a PCMCIA card that is communicatively coupled to receiver 106 via an IS679 compatible interface 112. However, other types of interfaces may also be used to couple replaceable security module 110 to receiver 106. Replaceable security module 110 includes a de-scrambler 114 that removes the encryption placed into the encoded audio signals AS_1 , AS_2 through AS_N and video signals VS_1 , VS_2 through VS_N by scramblers S_1 , S_2 through S_N . The de-scrambled single audio-visual signal is then returned to receiver 106 and decoded with a decoder 116 contained in receiver 106. The de-scrambled and decoded audio-visual signal is then provided to a display 118 to be displayed or otherwise viewed.

One of the advantages of using this approach is that all of the de-scrambling operations are performed in replaceable security module 110. This allows manufacturers to provide standard receivers without specialized de-scrambling. For IS679 applications, the replaceable security modules may be in the form of a smart card or a PCMCIA card, providing “personalized” security.

Despite the advantages of this approach, it is not without its own disadvantages and limitations. One disadvantage to this approach is that in situations where interface 112 is accessible, the de-scrambled audio-visual signals can be redistributed to other locations and then decoded and displayed, circumventing the copy protection. For example, in the case of a DVD player that uses a replaceable security module as illustrated in Figure 1, if interface 112 can be accessed, then the de-scrambled (unprotected) audio-visual signal can be distributed to multiple receivers and display devices and even recorded and redistributed.

Based upon the need to provide copy protection of audio-visual signals in IS679 application and the limitations in the prior approaches, an approach for providing copy protection of audio-visual signals IS679 applications that avoids the problems associated with the prior approaches is highly desirable.

SUMMARY OF THE INVENTION

In general, embodiments of the present invention provide for the copy protection of distributed material after conditional access is applied, regardless of where the material is distributed. The solutions described herein provide the advantage of being sufficiently simple in implementation to qualify what is known in the art as “curb high” solutions. “Curb high” solutions provide a range of security from minimal security to a high level of security while requiring relatively fewer system resources to implement than prior approaches.

The method of the preferred embodiment of the present invention for copy protecting a digital signal representing audio-visual information, comprises the steps of: (a) encoding the digital signal to obtain an encoded signal; (b) converting the encoded signal into a copy protected signal using a copy protection function, wherein the function utilizes a data signal representing copy protection data; and (c) scrambling the copy protected signal to obtain a scrambled signal.

The system of the preferred embodiment of the present invention for recovering an audiovisual signal from a digital signal including a scrambled signal and a copy protection data signal representing copy protection data, comprises a receiver and a descrambler module interconnected via a link.

The descrambler module includes:

(1) a first communication interface for communicating with the receiver via the link; and

(2) a descrambler for descrambling an incoming scrambled signal from the receiver via the link.

5

The receiver includes:

(1) a second communication interface for communicating with the descrambler module via the link,

(2) a processor for: (i) removing said data signal from the digital signal, and storing the copy protection data represented by the data signal in a memory device, (ii) extracting said scrambled signal from the digital signal, and providing the scrambled signal to the descrambler via the link; and

(3) a reconverter for converting an incoming copy protected signal from the descrambler back into said audiovisual signal using an inverse copy protection function, wherein the inverse function utilizes said stored copy protection data.

15

In this preferred embodiment of the present invention, the signals flowing from the descrambler module to the receiver via the link are protected against copying.

BRIEF DESCRIPTION OF THE DRAWINGS

5 The above and other features, organizations, advantages and objects of the present invention, which are believed to be novel, are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages, will be fully understood from the following detailed description and the accompanying drawings. Each of the drawings contained herein are not considered to be accurate depictions of the embodiments of the invention, but are provided for illustrative purposes only and are to be interpreted in conjunction with the attached specification.

Figure 1 illustrates a conventional arrangement for copy protecting an audio-visual signal using a replaceable security module that is coupled to a receiver via an IS679 interface.

Figure 2 illustrates an arrangement for copy protecting audio-visual signals using a replaceable security module according to a preferred embodiment of the present invention.

Figure 3 is a block diagram of an arrangement that illustrates a second preferred embodiment of the present invention.

Figure 4 is a block diagram that illustrates a computer system upon which a preferred embodiment of the invention may be implemented.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following description is provided to enable any person skilled in the art to make and use the invention and sets forth the best modes presently contemplated by the inventors of carrying out the invention. Various modifications, however, will remain readily apparent to those skilled in the art, since the generic principles of the present invention have been defined herein.

Figure 2 illustrates an arrangement 200 for copy protecting audio-visual signals using a replaceable security module according to a preferred embodiment of the present invention. One or more audio-visual signals, identified as AVS_1 , AVS_s through AVS_N are provided to a transmitter 202, typically at rates in the range of 6Mbits/sec to 100Mbits/sec. Audio-visual signals AVS_1 , AVS_2 through AVS_N are encoded by encoders E_1 , E_2 through E_N respectively contained in transmitter 202, using, for example, MPEG encoding techniques, and separated into audio signals AS_1 , AS_2 through AS_1 and video signals VS_1 , VS_2 through VS_N .

A function is applied to audio signals AS_1, AS_2 through AS_N and video signals VS_1, VS_2 through VS_N by function modules, F_1, F_2 through F_N respectively to add copy protection. Copy protection data CP DATA is provided to transmitter 202 and used by function modules F_1, F_2 through F_N to apply the function to audio signal AS_1, AS_2 through AS_N and video signals VS_1, VS_2 through VS_N .

After being processed by function modules F_1, F_2 through F_N , audio signals AS_1, AS_2 through AS_N and video signals VS_1, VS_2 through VS_N are encrypted by scramblers S_1, S_2 through S_N respectively using for example, any number of widely available key encryption techniques and copy of protection data CP DATA. Encryption information required by scramblers S_1, S_2 through S_N , such as for example, encryption key information, is provided by a conditional access management system (not illustrated) that is typically included in transmitter 202, but may reside elsewhere.

The encrypted audio signals AS_1, AS_2 through AS_N , video signals VS_1, VS_2 through VS_N and copy protection data CP DATA are then combined by a combiner 204 to provide a single audio-visual signal. Thus, the copy protection data CP DATA is included in the single audio-visual signal. Combiner 204 may include several processors, such as multiplexers and other processors, necessary to provide the single audio-visual signal.

The single audio-visual signal is then provided to a receiver 206 via a link 208. As with link 108 of Figure 1, link 208 can include one or more communication mediums or systems, or both, and supporting apparatuses that are configured to carry the single audio-visual signal between transmitter 202 and receiver 206. Examples of link 208 include, but are not limited to, a telephone system, a cable television system, a broadcast television system (direct or indirect), a satellite broadcast system (direct or indirect), one or more computer networks and/or buses, the Internet, an intranet, and any software, hardware and other communication systems and equipment associated therewith for transmitting encoded data between two locations.

When receiver 206 receives the audio-visual signal via link 208, the copy protection data CP DATA is removed from the audio-visual signal by processor 210. For applications where the audio-visual signal on link 208 is formatted in packets, processor 210 extracts one or more data packets containing the copy protection data CP DATA from the audio-visual signal and replaces them with data packets containing predetermined data, such as NULL values. For example, data packets containing copy protection data CP DATA may have a predetermined data packet identification, so that they can be easily identified by processor 210.

Then the single audio-visual signal is provided to a replaceable security module 212 via an interface 214. For IS679 applications, replaceable security module 212 is a smart card or a PCMCIA card that is communicatively coupled to

receiver 206 via an IS679 compatible interface 214. Replaceable security module 212 includes a de-scrambler 216 that removes the encryption placed into the encoded audio signals AS_1, AS_2 through AS_N and video signals VS_1, VS_2 through VS_N by scramblers S_1, S_2 through S_N .

5 The de-scrambled single audio-visual signal is then returned to receiver 206 via interface 214. Thus, the de-scrambled audio-visual signal received by receiver 206 from replaceable security module 212 does not contain the encryption provided by scramblers S_1, S_2 through S_N but does still contain the copy protection applied by function modules F_1, F_2 through F_N .

10 The de-scrambled audio-visual signal is then provided to function block F^{-1} that applies an inverse function to F^{-1} to remove the copy protection applied by function modules F_1, F_2 through F_N using the copy protection data CP DATA that was extracted from the audio-visual signal by processor 210. According to the preferred embodiment of the present invention, function block F^{-1} bases the
15 application of the inverse function F^{-1} to the de-scrambled audio-visual signal on the presence of data packets containing the predetermined value. For example, when function block F^{-1} identifies a data packet that contains the predetermined value, the new copy protection data CP DATA retained by receiver 206 is used by function block F^{-1} to apply the inverse function F^{-1} to the subsequent data packets
20 until the next data packet containing the predetermined value is identified.

The de-scrambled audio-visual signal is then decoded by a decoder 218 contained in receiver 106. The de-scrambled and decoded audio-visual signal is then provided to a display 220 to be displayed or otherwise viewed.

5 This approach of the preferred embodiment of the present invention provides several important advantages over prior approaches for providing copy protection of audio-signal. First, this approach provides a higher level of security than the prior art approach described with reference to Figure 1, because the de-scrambled signal provided by replaceable security module 212 contains the copy protection provided by function modules F_1 , F_2 through F_N , but does not contain the copy protection data CP DATA, which was removed by processor 210. Once removed from the audio-visual signal, the copy protection data CP DATA is maintained internally in receiver 206. Thus, the de-scrambled signal provided by replaceable security module 212 cannot be used by other receivers and/or recording devices, even those that contain a function block equivalent to function block F^{-1} because they will not have access to copy protection data CP DATA, which can be periodically changed.

15 In addition, this copy protection approach is very flexible and allows receiver manufacturers to continue a standard design without special components or algorithms, since processor 210 and function block F^{-1} may be implemented as standard components. The copy protection functionality, including the level of

20

copy protection, is defined by the copy protection data CP DATA provided to transmitter 202.

Thus, function modules F_1 , F_2 through F_N may perform a relatively simple function, such as an exclusive OR logical operation (XOR). The advantage of using a simple function is that relatively fewer system resources are required to implement the F and F^{-1} functions compared to conventional approaches that use sophisticated encryption algorithms. However, more exotic functions may be used depending upon the level of copy protection desired for a particular application. In the context of MPEG2 encoding, a single packet of 184 bytes of data may be used to perform an XOR function of 64 to 1000 bits. Moreover, the copy protection data CP DATA may be changed as frequently as needed upon the requirements of a particular application.

According to a second preferred embodiment of the present invention, the copy protection data CP DATA is not included in the audio-visual signal, but instead is generated internally by the receiver and provided to the replaceable security module. Figure 3 is a block diagram of an arrangement 300 that illustrates this approach. A receiver 302 receives an audio-visual signal (AVS) that is provided to a replaceable security module 304 via an IS679 interface 306.

Replaceable security module includes a de-scrambler 308 for de-scrambling the AVS signal. The AVS is then provided to a function module F that copy

protects the AVS by applying a function to AVS using copy protection data to generate a processed AVS. The CP DATA is randomly generated by receiver 302 and provided to replaceable security module 302.

5 The processed AVS is provided back to receiver 302 via interface 306 where a function module F^{-1} applies a function using the copy protection data CP DATA to remove the copy protection previously applied by function module F. The AVS data is then decoded by a decoder D and provided to display 310 to be displayed or otherwise viewed. This approach avoids having to include the copy protection data CP DATA in the AVS. Since the copy protection data CP DATA can be randomly generated, the use of specialized components or algorithms in receiver 302 is still avoided.

10 Although embodiments of the invention have been described herein in the context of providing copy protection for the IS679 interface application, the approaches described herein are applicable to other audio-visual arrangements. In addition, the approaches described herein are applicable to other types of signals and information besides audio-visual signals.

15 The various components described above may be implemented as discrete hardware components, one or more software processes, or a combination of discrete hardware components and on or more software processes. In this regard,

Figure 4 is a block diagram that illustrates a computer system 400 upon which an embodiment of the invention may be implemented.

Computer system 400 includes a bus 402 or other communication mechanism for communicating information, and a processor 404 coupled with bus 402 for processing information. Computer system 400 also includes a main memory 406, such as a random access memory (RAM) or other dynamic storage device, coupled to bus 402 to storing information and instructions to be executed by processor 404. Main memory 406 also may be used for storing temporary variables or other intermediate information during execution of instructions to be executed by processor 404.

Computer system 400 further includes a read only memory (ROM) 408 or other static storage device coupled to bus 402 for storing static information and instructions for processor 404. A storage device 410, such as a magnetic disk or optical disk, is provided and coupled to bus 402 for storing information and instructions.

Computer system 400 may be coupled a via bus 402 to a display 412, such as a cathode ray tube (CRT), for displaying information to a computer user. An input device 414, including alphanumeric and other keys, is coupled to bus 402 for communicating information and command selections to processor 404. Another type of user input device is cursor control 416, such as a mouse, a trackball, or

5 cursor direction keys for communicating direction information and command selections to processor 404 and for controlling cursor movement on display 412. This input device typically has two degrees of freedom in two axes, a first axis (e.g., x) and a second axis (e.g., y), that allows the device to specify positions in a plane.

10 The embodiments of the present invention are related to the use of computer systems 400 for providing copy protection of audio-visual signals in IS679 applications. According to one preferred embodiment of the invention, the copy protection of audio-visual signals in IS679 applications is provided by computer system 400 in response to processor 404 executing one or more sequences of one or more instructions contained in memory 406. Such instructions may be read into main memory 406 from another computer-readable medium, such as storage device 410. Execution of the sequences of instructions contained in main memory 406 causes processor 404 to perform the process steps described herein. One or more processors in a multi-processing arrangement may also be employed to execute the sequences of instructions contained in main memory 406. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with software instructions to implement the embodiments of the present invention. Thus, embodiments of the present invention are not limited to any specific combination of hardware circuitry and software.

15
20

The term "Computer-readable medium" as used herein refers to any medium that participates in providing instructions to processor 404 for execution. Such a medium may take many forms, including but not limited to, non-volatile media, volatile media, and transmission media. Non-volatile media includes, for example, optical or magnetic disks, such as storage device 410. Volatile media includes dynamic memory, such as main memory 406. Transmission media includes coaxial cables, copper wire and fiber optics, including the wires that comprise bus 402. Transmission media can also take the form of acoustic or light waves, such as those generated during radio wave and infrared data communications.

Common forms of computer-readable media include, for example, a floppy disk, a flexible disk, hard disk, magnetic tape, or any other magnetic medium, a CD-ROM, any other optical medium, punch cards, paper tape, any other physical medium with patterns of holes, a RAM, PROM, and EPROM, a FLASH-EPROM, any other memory chip or cartridge, a carrier wave as described hereinafter, or any other medium from which a computer can read.

Various forms of computer readable media may be involved in carrying one or more sequences of one or more instructions to processor 404 for execution. For example, the instructions may initially be carried on a magnetic disk of a remote computer. The remote computer can load the instructions into its dynamic memory and send the instructions over a telephone line using a modem. A modem local to

computer system 400 can receive the data on the telephone line and use an infrared transmitter to convert the data to an infrared signal. An infrared detector coupled to bus 402 can receive the data carried in the infrared signal and place the data on bus 402. Bus 402 carries the data main memory 406, from which processor 404 retrieves and executes the instructions. The instructions received by main memory 406 may optionally be stored on storage device 410 either before or after execution by processor 404.

Computer system 400 also includes a communication interface 418 coupled to bus 402. Communication interface 418 provides a two-way data communication coupling to a network link 420 that is connected to a local network 422. For example, communication interface 418 may be an integrated services digital network (ISDN) card or a modem to provide a data communication connection to a corresponding type of telephone line. As another example, communication interface 418 may be a local area network (LAN) card to provide a data communication connection to a compatible LAN. Wireless links may also be implemented. In any such implementation, communication interface 418 sends and receives electrical, electromagnetic or optical signals that carry digital data streams representing various types of information.

Network link 420 typically provides data communication through one or more networks to other data devices. For example, network link 420 may provide a connection through local network 422 to a host computer 424 or to data

equipment operated by an Internet Service Provider (ISP) 426. ISP in turn provides data communication services through the world wide packet data communication network now commonly referred to as the "Internet" 428. Local network 422 and Internet 428 both use electrical, electromagnetic or optical signals that carry digital data streams. The signals through the various networks and the signals on network link 420 and through communication interface 418, which carry the digital data to and from computer systems 400, are exemplary forms of carrier waves transporting the information.

Computer system 400 can send messages and receive data, including program code, through the network(s), network link 420 and communication interface 418. In the Internet example, a server 430 might transmit a requested code for an application program through Internet 428, ISP 426, local network 422 and communication interface 418. In accordance with the invention, one such downloaded application provides for providing copy protection of audio-visual signals in IS679 applications as described herein.

The received code may be executed by processor 404 as it is received, and/or stored in storage device 410, or other non-volatile storage for later execution. In this matter, computer systems 400 may obtain application code in the form of a carrier wave.

In the foregoing specification, the invention has been described with reference to specific embodiments thereof. It will, however, be evident that various modifications and changes may be made thereto without departing from the broader spirit and scope of the invention. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense.

5

CLAIMS

What is claimed is:

1. A method of copy protecting a digital signal representing audio-visual information, comprising the steps of:
 - (a) encoding the digital signal to obtain an encoded signal;
 - (b) converting the encoded signal into a copy protected signal using a copy protection function, wherein the function utilizes a data signal representing copy protection data; and
 - (c) scrambling the copy protected signal to obtain a scrambled signal.
2. The method of claim 1 further comprising the step of transmitting the scrambled signal and the data signal to a receiver.
3. The method of claim 1 further comprising the step of transmitting the scrambled signal and said data signal as a single signal.
4. The method of claim 3 wherein the step of transmitting further comprises combining the scrambled signal and said data signal into said single

signal.

5. The method of claim 3 further comprising the steps of:

- (a) receiving said single signal in a receiver;
- (b) removing said copy protection data signal from the single signal, and storing the copy protection data represented by the copy protection data signal in a memory device;
- (c) recovering said scrambled signal from the single signal;
- (d) descrambling the recovered scrambled signal to regain said copy protected signal;
- (e) reconvert the regained copy protected signal back into said encoded signal using an inverse copy protection function, wherein the inverse function utilizes said stored copy protection data; and
- (f) decoding the encoded signal to recover said digital signal.

6. The method of claim 1 further comprising the steps of:

(a) descrambling the scrambled signal to recover said copy protected signal;

(b) reconvert the recovered copy protected signal back into said encoded signal using an inverse copy protection function, wherein the inverse function utilizes the copy protection data from said data signal; and

(c) decoding the converted encoded signal to recover said digital signal.

7. A method of recovering an audiovisual signal from a digital signal including a scrambled signal and a copy protection data signal representing copy protection data, comprising the steps of:

(a) extracting said data signal from the digital signal;

(b) storing the copy protection data from said data signal in a memory device;

(c) extracting the scrambled signal from the digital signal;

(d) descrambling the scrambled signal to recover a copy protected signal;

(e) reconverting the copy protected signal into an encoded signal using an inverse copy protection function, wherein the inverse function utilizes said stored copy protection data; and

(f) decoding the encoded signal to recover said audio-visual signal.

8. A system for copy protecting a digital signal representing audio-visual information, comprising:

(a) an encoder to encode the digital signal to obtain an encoded signal;

(b) a converter to convert the encoded signal into a copy protected signal using a copy protection function, wherein the function utilizes a data signal representing copy protection data; and

(c) a scrambler for scrambling the copy protected signal into a scrambled signal.

9. The system of claim 8 further comprising a transmitter for transmitting the scrambled signal and the data signal to a receiver.

10. The system of claim 8 further comprising a combiner for combining the scrambled signal and said data signal into said single signal, and a transmitter for transmitting said single signal.

11. The system of claim 8 further comprising a transmitter for transmitting the scrambled signal and said data signal as a single signal.

12. The system of claim 11 further comprising:

- (a) a receiver for receiving said single signal in a receiver;
- (b) a processor for: (1) removing said data signal from the single signal, and storing the copy protection data represented by the data signal in a memory device, and (2) recovering said scrambled signal from the single signal;
- (c) a descrambler for descrambling the recovered scrambled signal to regain said copy protected signal;

- (d) a reconverter for converting the regained copy protected signal back into said encoded signal using an inverse copy protection function, wherein the inverse function utilizes said stored copy protection data; and
- (e) a decoder for decoding the encoded signal to recover said digital signal.

13. The system of claim 8 further comprising:

- (a) a descrambler for descrambling the scrambled signal to recover said copy protected signal;
- (b) a reconverter for converting the recovered copy protected signal back into said encoded signal using an inverse copy protection function, wherein the inverse function utilizes the copy protection data from said data signal; and
- (c) a decoder for decoding the converted encoded signal to recover said digital signal.

14. A system for recovering an audiovisual signal from a digital signal including a scrambled signal and a copy protection data signal representing copy

protection data, the system comprising:

- (a) a processor for: (1) removing said data signal from the digital signal, and storing the copy protection data represented by the data signal in a memory device, and (2) recovering said scrambled signal from the digital signal;
- (b) a descrambler for descrambling the recovered scrambled signal to recover a copy protected signal;
- (c) a reconverter for converting the regained copy protected signal back into said encoded signal using an inverse copy protection function, wherein the inverse function utilizes said stored copy protection data; and
- (d) a decoder for decoding the encoded signal to recover said audio-visual signal.

15. A system for recovering an audiovisual signal from a digital signal including a scrambled signal and a copy protection data signal representing copy protection data, the system comprising a receiver and a descrambler module interconnected via a link, wherein:

(a) the descrambler module includes:

- (1) a first communication interface for communicating with the receiver via the link, and
- (2) a descrambler for descrambling an incoming scrambled signal from the receiver via the link; and

(b) the receiver includes:

- (1) a second communication interface for communicating with the descrambler module via the link,
- (2) a processor for: (i) removing said data signal from the digital signal, and storing the copy protection data represented by the data signal in a memory device, (ii) extracting said scrambled signal from the digital signal, and providing the scrambled signal to the descrambler via the link; and
- (3) a reconverter for converting an incoming copy protected signal from the descrambler back into said audiovisual signal using an inverse copy protection function, wherein the

inverse function utilizes said stored copy protection data;
and

whereby the signals flowing from the descrambler module to the receiver
via the link are protected against copying.

16. The system of claim 15, wherein the incoming audio-visual signal
into the receiver is encoded and scrambled, and wherein the receiver further
includes a decoder for decoding said reconverted signal.

17. The system of claim 15, wherein the descrambler module comprises
a PCMIA card.

18. The system of claim 15, wherein first and second communication
interfaces comprise IS679 compatible interfaces.

19. The system of claim 215, wherein the link comprises one or more
communication mediums configured for carrying audio-visual signals.

20. In a copy protection system including a receiver interconnected to a descrambler module via a link, a method of copying protecting signals flowing from the descrambler module to the receiver via the link, comprising the steps of:

(a) receiving a digital signal in the receiver, the digital signal including a scrambled audio-visual signal;

(b) generating a copy protection data signal representing copy protection data;

(c) transmitting the digital signal from the receiver to the descrambler module via the link;

(d) descrambling the scrambled audio-visual signal in the descrambler module to obtain said audiovisual signal;

(e) converting the audio-visual signal in the descrambler module into a copy protected signal using a copy protection function, wherein the function utilizes said data signal;

(f) transmitting the copy protected signal from the descrambler to the receiver via the link; and

(g) reconverting the copy protected signal to the audio-visual signal in the receiver using an inverse copy protection function, wherein the inverse function utilizes said data signal.

21. The method of claim 20, wherein the step of generating said data signal includes generating the copy protection data signal in the receiver.

22. The method of claim 21 further comprising the step of transmitting said data signal from the receiver to the descrambler module via the link.

23. The method of claim 20, wherein said audio-visual signal in step (a) is encoded and scrambled.

24. The method of claim 23 further comprising the step of decoding the audio-visual signal in the receiver after the step of reconverting.

25. The method of claim 20, wherein the descrambler module comprises a PCMLA card.

26. The method of claim 20, wherein the link comprises one or more communication mediums configured for carrying audio-visual signals.

27. The method of claim 20, wherein the receiver and the descramble module utilize IS679 compatible interfaces for communication via the link.

28. A copy protection system comprising a receiver and a descrambler module interconnected via a link, wherein:

(a) the descrambler module includes: (1) a first communication interface for communicating with the receiver via the link, (2) a descrambler for descrambling an incoming scrambled audiovisual signal from the receiver via the link, and (3) a converter for converting the audiovisual signal into a copy protected signal using a copy protection function, the function utilizing copy protection data from the receiver, and for providing the copy protected signal to the receiver via the link;

(b) the receiver includes: (1) a second communication interface for communicating with the descrambler module via the link, (2) a signal generator for generating a copy protection data signal representing copy protection data and providing said data to the descrambler via the link, and (3) a reconverter for converting an incoming copy protected signal from the descrambler back into said audiovisual signal using an inverse copy protection function, wherein the inverse function utilizes said copy protection data;

20

wherein in response to receiving a digital signal including a scrambled audio-visual signal, the receiver transmits the digital signal and said copy protection data to the descrambler module via the link, and

25

wherein in response to receiving the digital signal and the copy protection data from the receiver, the descrambler module descrambles and converts the audio-visual signal into said copy protected signal, and transmits the copy protected signal to the receiver via said link, whereby the signals flowing from the descrambler module to the receiver via the link are protected against copying.

29. The system of claim 28, wherein the incoming audio-visual signal into the receiver is encoded and scrambled, and wherein the receiver further includes a decoder for decoding said reconverted signal.

30. The system of claim 28, wherein the descrambler module comprises a PCMIA card.

31. The system of claim 28, wherein the first and second communication interfaces comprise IS679 compatible interfaces.

32. The system of claim 28, wherein the link comprises one or more communication mediums configured for carrying audio-visual signals.

SYSTEM AND METHOD FOR COPY PROTECTION FOR DIGITAL SIGNALS

ABSTRACT OF THE DISCLOSURE

Embodiments of the present invention provide for the copy protection of distributed material after conditional access is applied, regardless of where the material is distributed. The solutions described provide the advantage of being sufficiently simple in implementation to qualify as “curb high” solutions. “Curb high” solutions provide a range of security from minimal security to a high level of security while requiring relatively fewer system resources to implement than prior approaches.

FIG. 1 (Prior Art)

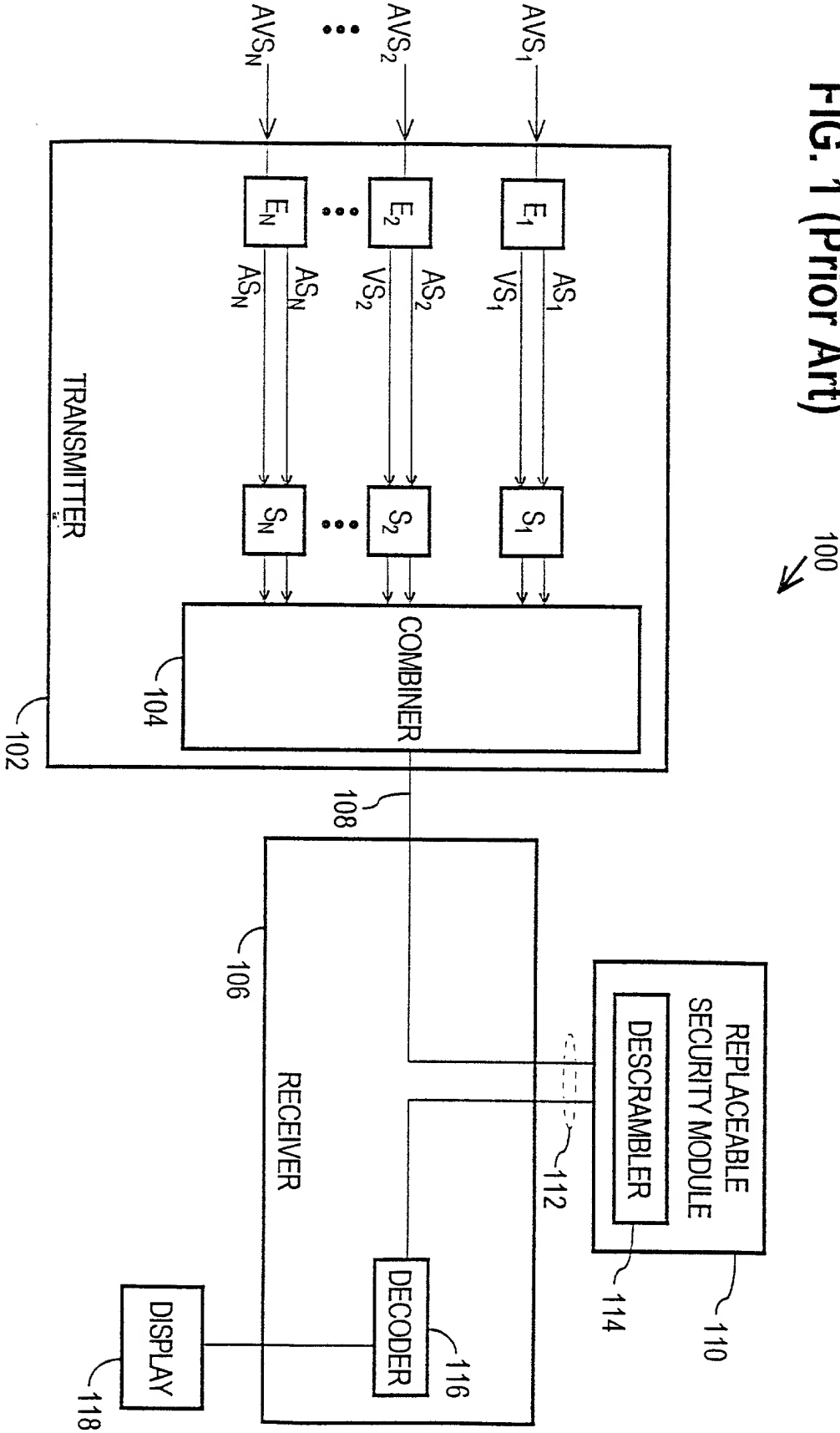


FIG. 1 (Prior Art) is a block diagram of a secure communication system. The system includes a TRANSMITTER (102) and a RECEIVER (106). The TRANSMITTER contains a COMBINER (104) and multiple parallel processing stages (E1, E2, ..., EN) and (S1, S2, ..., SN). Inputs to the transmitter are AVS1, AVS2, ..., AVSN. Each stage Ei receives AVSi and produces VSi, which is then processed by Si to produce ASi. The outputs AS1, AS2, ..., ASN are combined in the COMBINER (104). The RECEIVER (106) receives the combined signal (108) and contains a DECODER (116) and a DISPLAY (118). A REPLACEABLE SECURITY MODULE (110) containing a DESCRAMBLER (114) is connected to the receiver via a dashed line (112).

FIG. 2

200 ↗

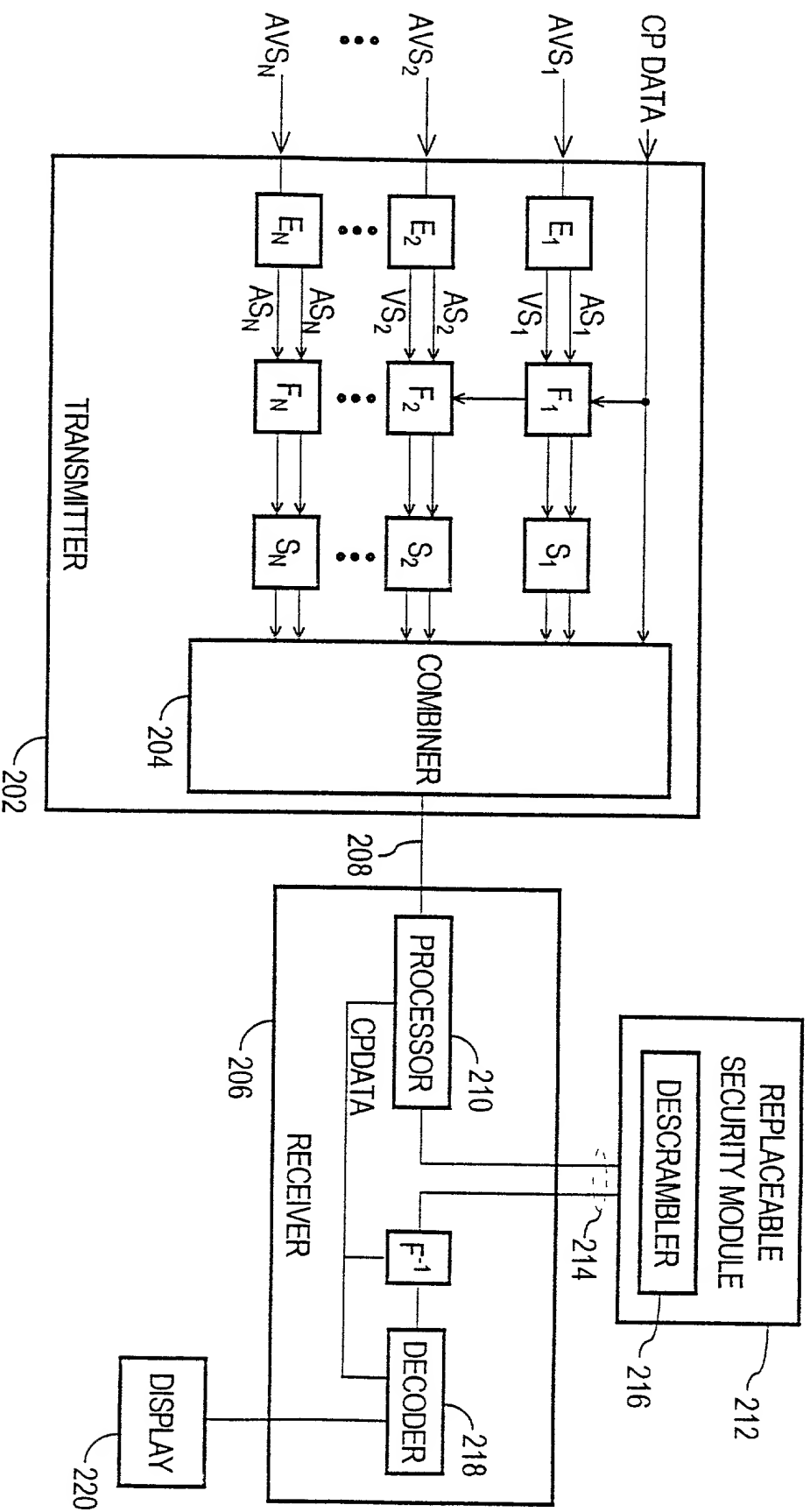


FIG. 3

300
↓

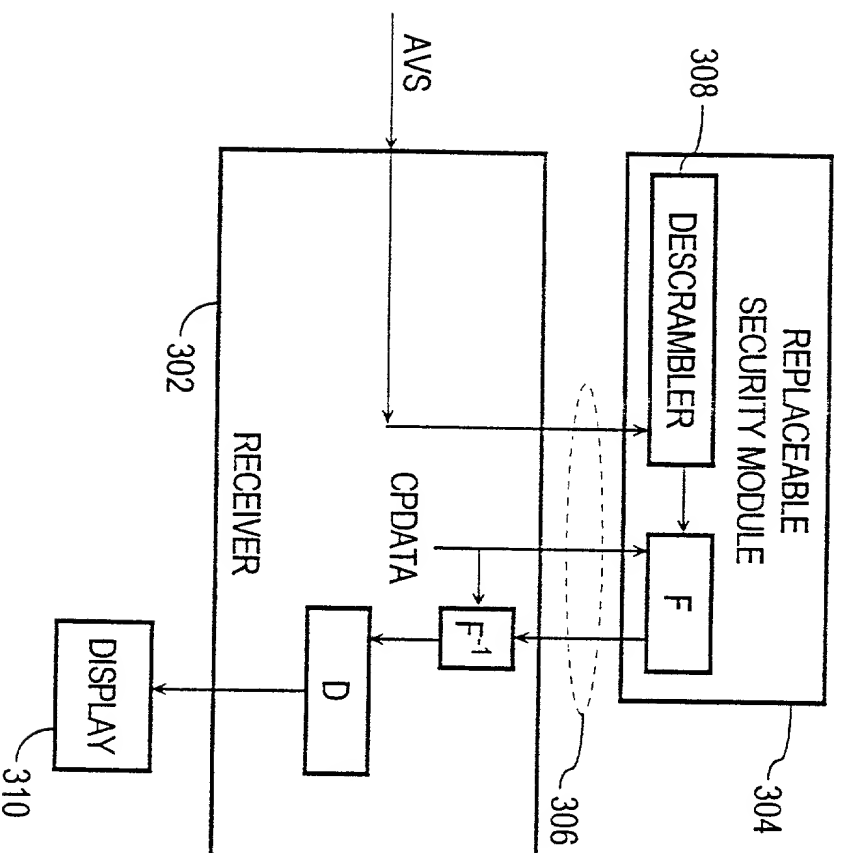
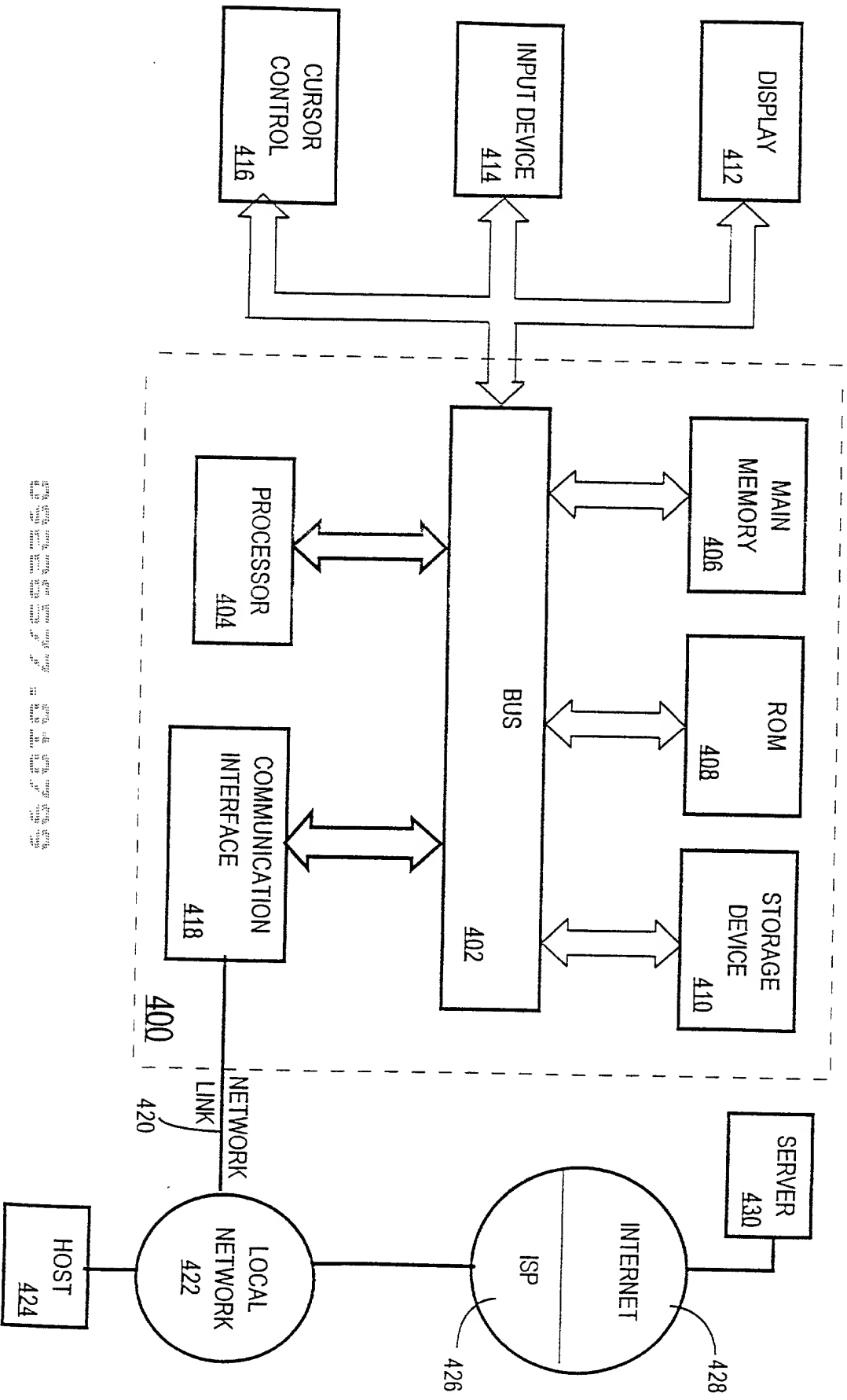


FIG.4



FACSIMILE (310) 789-3210

PATENT APPLICATION

FOR PATENT APPLICATION

As a below named inventor of an invention titled SYSTEM AND METHOD FOR COPY PROTECTION FOR DIGITAL SIGNALS, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled SYSTEM AND METHOD FOR COPY PROTECTION FOR DIGITAL SIGNALS the specification of which (check one)

Application Serial No. _____ and was
amended on (or amended through) _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Sec. 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Sec. 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)	Priority Claimed
------------------------------	---------------------

<u>Number</u>	<u>Country</u>	<u>Day/Month/Year Filed</u>	<u>Yes</u>	<u>X</u> <u>No</u>
---------------	----------------	-----------------------------	------------	-----------------------

I hereby claim priority benefits under Title 35, United States Code Sec. 119(e) of the below listed United States provisional application(s):

<u>60/070,764</u>	<u>January 8, 1998</u>
Appln. Serial No.	Filing Date

I hereby claim the benefit under Title 35, United States Code, Sec. 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Sec. 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Sec. 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

Appln. Serial No.	Filing Date	Status (patented, pending, abandoned)
-------------------	-------------	--

SHERMAN & SHERMAN

ATTORNEYS AT LAW

DOCKET NO. SAM1.0058

PATENT APPLICATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I/(We) hereby appoint the following attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: KENNETH L. SHERMAN, Registration No. 33,783. Direct all telephone calls to Kenneth L. Sherman at telephone No. (310) 789-3200.

Address all correspondence to:

SHERMAN & SHERMAN
2029 Century Park East
Seventeenth Floor
Los Angeles, California 90067

Full name of sole or first inventor:

JACK CHANEY

Inventor's signature: _____

Date: _____, 1999

Residence: 9110 Loganberry Drive
Gilroy, California 95020

Citizenship: U.S.A.

Post Office Address: Same

CERTIFICATE OF MAILING BY "EXPRESS MAIL"

I hereby certify that this paper of fee is being deposited with the United States Postal Service on this date: January 7, 1999, in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EH506244999US addressed to: Box Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231

Evelyn Menjivar

(Type or print name of person mailing paper)


(Signature of person mailing paper)

G:\KLS\SAM1\DECPOA.58